IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Gennadi FINKELSHTAIN et al.	**Confirmation No.:**	**5103**
		Group Art Unit:	1797
Serial No.	: 10/757,849		
		Examiner: Toomer, Cephia D	
Filed	: January 16, 2004		
For	: STORAGE-STABLE FUEL CONCENTRATE		

REPLY BRIEF UNDER 37 C.F.R. § 41.41(a)(1)

Commissioner for Patents
U.S. Patent and Trademark Office
Customer Service Window, Mail Stop Appeal Brief-Patents
Randolph Building
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Alexandria, VA 22314

Sir:

This Reply Brief is in response to the Examiner's Answer mailed October 28, 2008, the period for reply extending until December 29, 2008.

In the Examiner's Answer, the Examiner maintains the grounds of rejection set forth in the final rejection.

Appellants note that the Examiner's Answer does not sufficiently address several of Appellants' arguments as to why the rejections are without merit, and misrepresents some of the facts. These deficiencies have prompted the present Reply Brief.

Appellants also note that this Reply Brief is being filed under 37 C.F.R. § 41.41(a)(1) and is directed to the arguments presented in the Examiner's Answer, and therefore must be entered unless the final rejection is withdrawn in response to the instant Reply Brief.

In order to avoid repetition, the following response to the Examiner's arguments in the Examiner's Answer will be limited to issues which in Appellants' opinion are important enough to warrant a further comment. Accordingly, Appellants' silence with respect to any allegations

set forth in the Examiner's Answer which are not specifically addressed below should by no means be construed as Appellants' admission that these allegations are of any merit.

REPLY

1. At page 3, next-to-last paragraph of the Examiner's Answer it is alleged that "Tsang teaches the production of two solutions, one comprising metal borohydride, water and alkali or alkaline earth hydroxide (NaOH or KOH) (solution A), the other comprising water and optional additives (solution B), which are then combined thus diluting each and which then forms a mixture used as a fuel in a fuel cell".

Appellants submit that the above allegation is misleading in that it suggests that the mixture of solution A and solution B as such is used as fuel, i.e., is added directly to a fuel cell. Clearly, it is not this mixture that is added to the fuel cell, but the hydrogen gas that is generated by this mixture after this mixture has been contacted with a catalyst which catalyzes the hydrolysis of the metal borohydride, which hydrolysis results in the formation of the hydrogen gas.

2. At page 3, last paragraph of the Examiner's Answer it is alleged that "Tsang teaches that solution A and solution B are held in separate containers or compartments until they are mixed together".

Appellants submit that this allegation suggests that TSANG discloses compartments, i.e., a container which comprises two or more compartments. This is clearly not the case.

3. At page 4, second paragraph of the Examiner's Answer it is alleged that "Amendola suggests that a higher pH is more effective, as well as suggests starting with a concentrated solution and adding water during use".

Appellants submit that AMENDOLA does not suggest "starting with a concentrated solution". Appellants point out again that paragraph [0032] of AMENDOLA states (emphases added):

> Since two water molecules are consumed for each borohydride molecule according to reaction (1), the concentration of all the remaining components (the cation, the borate, and the borohydride) will increase as the reaction continues. Therefore, twice as many water molecules as borohydride molecules are needed to sustain a constant rate of reaction. This excess water can be provided to the reaction in two ways: (i) charging the initial metal hydride solution with excess water, i.e., starting with a dilute solution, or (ii) adding more water from a separate source during or after the reaction. The second alternative is preferred to minimize the initial starting weight of water plus borohydride. Adding water from a separate source during or after the reaction is viable because the main byproduct of hydrogen oxidation in a hydrogen-consuming device is water. A hydrogen-consuming device, as used herein, means a device that uses hydrogen as a fuel, e.g., a fuel cell, combustion engine, or a gas turbine. Thus, water generated from the hydrogen-consuming device can be added to the borohydride solution. Assuming that water is recycled from the fuel cell or engine, 8 weight units of hydrogen (4 from water and 4 from borohydride) can come from 22 weight units of lithium borohydride. The resulting theoretical hydrogen conversion ratio is 36.36% by weight of hydrogen per unit of borohydride (8.div.22.times.100). Therefore, the hydrogen generation system can include a slurry tank to store the borohydride and an adjacent mixing tank to add additional water obtained from the exhaust of the hydrogen consuming device, thereby allowing complete reaction of the borohydride while preventing the borohydride solution from drying out, i.e., preventing the components of the borohydride solution from precipitating out of solution.

Accordingly, what AMENDOLA actually teaches is that the initial metal borohydride solution for making hydrogen gas is not a concentrate but can (and preferably is) used as such. However, since during the hydrolysis of the borohydride twice as much water as borohydride is consumed (i.e., without supply of additional water a concentrate will gradually be formed during the process), the (molar) excess of water that will be consumed during the hydrolysis operation

should be added to the solution either right at the beginning of the process or during or after the process, with the addition during or after the process being preferred.

In other words, AMENDOLA in no way teaches or suggests that the use of a borohydride solution concentrate as a starting material for the process disclosed therein is desirable. What AMENDOLA teaches is that an undesirable concentrated solution (which may result in the precipitation of dissolved components, i.e., starting materials and reaction products) will inevitably be formed gradually during the use of the solution for generating hydrogen unless additional water is added right at the beginning of the process or (preferably) during or after the process.

4. At page 4, last paragraph of the Examiner's Answer it is alleged that "Tsang clearly sets forth that these compositions are in separate packages or containers and that he mixes them to form the fuel."

Appellants respectfully submit that TSANG does not mention any "packages". Further, it is pointed out again that the mixture made from the contents of the "containers" (tanks) of TSANG is not a fuel (it would not serve any useful purpose if it were supplied as such to a hydrogen-based fuel cell). In fact, unless this mixture can be contacted with a catalyst which catalyzes the formation of hydrogen gas therefrom (by hydrolysis of the borohydride) this mixture apparently is of very limited, if any, value.

5. At page 6, first paragraph of the Examiner's Answer it is alleged that "[t]he mere mentioning [in TSANG] of pumps metering the solutions from the containers to the reaction chamber does not imply an industrial scale process. If that were the case, a fuel pump in an

automotive internal combustion engine would be considered an industrial scale process since the pump transfers and meters the gasoline from the fuel tank to the engine."

Appellants again point out that TSANG does not mention "containers" but tanks that hold solutions A and B. Also, in col. 1, lines 13-18, TSANG describes the disadvantages of the prior art which the invention of TSANG intends to overcome:

> The fuel cell technology relating to hydrogen-proton exchange membrane (H_2 -PEM) is of increasing interest as an alternative source of energy. A major concern is the use of pressurized H_2 and O_2 /air containers. H_2 is difficult to liquefy, yet the means of generating it only as needed is essential for the efficient working of PEM cells.

The above passage is another indication that the invention described by TSANG is to be carried out on a large scale such as, e.g., an industrial or at least commercial scale.

Regarding the Examiner's comments regarding an automotive internal combustion engine, Appellants note that while the operation of an automobile admittedly does not qualify as operation on an industrial scale, even on this smaller scale it is difficult to imagine that if gasoline were a completely harmless substance it would be offered in, e.g., a store in packaged form (in, say, 5-gallon containers).

6. At page 6, second paragraph of the Examiner's Answer it is alleged that "Appellant argues that the catalyst of Tsang would produce an undesirable reaction because he prefers to use ruthenium, whereas Appellant states that platinum and palladium are the preferred catalyst for a direct liquid fuel cell."

Appellants submit that this abridged version of the arguments set forth at pages 16 and 17 of the Appeal Brief is not an accurate representation of Appellants' arguments. Essentially, what Appellants wanted to convey is that the mixture of solutions A and B according to TSANG and

the fuel for a direct liquid fuel cell recited in the rejected claims have to satisfy different and at least in part, conflicting requirements. For example, upon being contacted with the catalyst disclosed therein the mixture of TSANG is intended to readily and rapidly form hydrogen gas (by hydrolysis of the borohydride contained therein). In contrast, a liquid fuel for a direct liquid fuel cell is not intended to form hydrogen when contacted with the catalyst of the anode but is to be oxidized as such (i.e., in the form of the borohydride contained therein). Accordingly, even if the catalyst of TSANG and the catalyst of an anode of a direct liquid fuel cell were to contain the same metal (such as, e.g., platinum), the characteristics of the catalysts and the liquids to be contacted therewith would have to be different. This is reflected by the fact that the preferred hydrolysis catalyst metals according to TSANG are not platinum or palladium (which are conventionally used in anode oxidation catalysts), but ruthenium and rhodium.

7. At page 7, second paragraph of the Examiner's Answer it is alleged that "[t]he skilled artisan would recognize that the containers of Tsang may be rearranged because rearranging the containers would not have modified the operation of the containers. The solution in the first container would still be mixed with the solution of the second container to produce hydrogen."

Appellants point out again that the "containers" of TSANG are tanks. Also, even if one were to assume, *arguendo*, that TSANG teaches or suggests a single tank with two compartments it is not seen that TSANG teaches or suggests that this combined tank allows a mixing of solutions A and B (already) inside this combined tank (see rejected claims 99 and 102).

8. In the paragraph bridging pages 7 and 8 of the Examiner's Answer it is alleged that "Appellant argues that Tsang would not apply to claim 139 because Tsang does not teach using the container as a filling device for the fuel cell. The Examiner respectfully disagrees. Tsang teaches that the contents of the containers are mixed and that the gas produced from this mixture is used to fill the fuel cell. Therefore, Tsang does use the containers to fill a fuel cell."

Appellants submit that even if one were to agree with the Examiner that one can take the position that the hydrogen gas formed from the mixture of solutions A and B of TSANG is used to "fill" a fuel cell, it would not be the "containers" (= tanks 22 and 24) of TSANG (which hold solutions A and B) but the (catalyst containing) reaction chamber 20 in Figure 1 of TSANG from which the hydrogen gas is "filled" into the fuel cell.

9. At page 8, second paragraph of the Examiner's Answer it is alleged that "it is well settled that a claimed device being portable or movable is not sufficient to patentably distinguish over an otherwise old device unless there are new or unexpected results."

Appellants submit that the Examiner has not provided any evidence which would support this allegation. At any rate, the term "portable" recited in some of the rejected claims does not refer to subject matter that is claimed but to a fuel cell for which the claimed container is to be used in order to indicate the non-obvious (implied) difference in size between the "containers" (tanks) of TSANG and the recited containers. In other words, for at least all of the reasons set forth in the Appeal Brief TSANG fails to render obvious reducing the size of the tanks described therein to dimensions which would be appropriate and suitable for use in combination with a portable hydrogen-based fuel cell.

CONCLUSION

Appellants again respectfully request that the rejection of claims 70-97, 99, 101-116, 119-130 and 132-143 be reversed and that the application be returned to the Examining Group for prompt allowance. Although no fee is believed to be required for entry of this Reply Brief, the Patent and Trademark Office is hereby authorized to charge any fee that is deemed to be necessary to Deposit Account No. 19-0089.

Respectfully submitted,
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